IPSANET

I. P. Sharp Communications Network

IPSANET

Local access to the mainframe computers of the I. P. Sharp timesharing or distributed systems is available via IPSANET, I. P. Sharp's own communications network, from Canada, United States, Europe, Australia, Hong Kong and Singapore. In 1973, I. P. Sharp introduced its own internally developed packet-switching network in Europe, and later, worldwide. Today the network is one of the largest and most advanced in the world.

IPSANET brings significant and unrivalled benefits:

High Reliability: Communications failures are much less frequent than with conventional multiplexing networks. Users are kept informed of the status of their connection to the mainframe system. For all cases where multiple routes through the network exist, the best route is automatically selected. The network is monitored 24 hours daily, every day.

Simple Enrolment: User enrolment is simple, rapid and universal. Once an account number has been issued authorizing access to a SHARP APL system, it can be immediately used at any access point on the network worldwide. There is no formality or billing procedure to be negotiated locally in each country from which access is required. There are no installation costs for users accessing by dial-up services.

Simple to Use: The signon procedure is reduced to a very simple form which is the same everywhere, and you have all the advantages of working with a single vendor which is providing the total service.

Local Support: Local advice and assistance is available through any of the many I. P. Sharp branch offices.

Fast Response: The network is optimised for interactive use.

Error-Free Transmission: Transmission errors are automatically detected and corrected by the network.

Terminal Flexibility: Terminals of many types and speeds are supported.

Low Connect Charges: There is no connect charge for access to distributed systems. Connect charges for timesharing are low (approximately $1.00/hour) whether you're located in Brussels, Sydney, Toronto or New York. In addition, the large number of local access locations reduces telephone costs to users.

Cost-Effective: The cost of use is very competitive with public data networks with their additional overheads inevitable with a generalized service. For many users, IPSANET is a very much cheaper alternative to dedicated lines.

At present, the network contains some 180 communications computers, called *nodes*, that are linked together providing a continuous network that includes most major cities. Many nodes are installed on customer premises, both at distributed system data centres and at remote branch offices, thus providing the same level of service to distributed system users as is available to timesharing customers.

The network also interconnects directly with many major public data networks including Datapac, Datex-P, PSS, Telenet, Telepac, Transpac and Tymnet. Through the local access cities of these networks, together with their interconnections to other public data networks throughout the world, access is provided by a local phone call in more than 600 places in 46 countries. The interconnection with the Telex network provides a means of access from any other location not served by IPSANET or public data networks.

Computer Hardware and Software

Two types of computer hardware are used for the network nodes. IBM 3705 communications controllers, or similar, are the nodes adjacent to distributed systems, and perform the front-end processor functions. To the mainframes, they appear identical to a 3705 running the IBM Emulator Program. In addition to supporting direct attachment of asynchronous terminals, the IPSANET Emulator Program (IEP) performs all IPSANET functions such as link management and call routing. The majority of nodes located throughout the world are Computer Automation Alpha 2/20 or 2/40 minicomputers, which in addition to the network functions can also be configured to support asynchronous or 3270 terminals, bisync devices, X25 interfaces to other networks, and direct attachment of peripherals.

Elements of Packet-Switching

All messages sent between the mainframe and a terminal are transmitted as one or more variable-length *packets*, each containing destination and error-checking information. As it travels through the network, a packet is checked at each node. If an error is detected, then retransmission is requested, resulting in virtually error-free transmission. The network packet length is optimized to give fast response to the short messages which arise in interactive systems.

Line Utilization

The link protocol which controls the data flow beween nodes was developed by I. P. Sharp to provide the greatest efficiency and fastest response. The efficient line utilization is based on statistical multiplexing. Advantage is taken of the fact that not all terminals connected to the network operate simultaneously at full speed. This makes possible the relatively low connect charges. In conventional networks, a fixed bandwidth must be allocated for the duration of the terminal connection. Packet-switching networks can achieve very high line utilization by freeing communication resources when they are not actually being used by a terminal, (i.e., when the user is thinking and no characters are being sent). At times of overload, the network is protected by flow control in both directions, and the data already in the network is queued within the nodes until a transmission slot becomes available. To the user, this appears as slight inter-packet pauses.

Node Intelligence

A high degree of intelligence is built into the nodes. Line 'hits' or failures will not result in disconnection of the user from the mainframe system if the line recovers within 15 seconds. The nodes are able at all times to reply to users, keeping them aware of the status of their connection. In addition, the network is able to recognize automatically and adapt to the type and speed of the terminal being used.

Nodes can be installed anywhere where several terminals are used concurrently, resulting in reduced dial costs and reduced error rates on local telephone lines. Terminals can be connected directly to the node eliminating the need for modems.

Operational Convenience

The operational simplicity of IPSANET is a major factor in its reliability. Essentially the whole of the network can be controlled and managed from any location. Nodes may be configured and restarted without interrupting the operation of other nodes. An error-tracing facility also allows the software in one node to be inspected and modified remotely from another. The *down line load* capability means that nodes are always loaded with the latest version of software from the central system through the network. This, coupled with the intrinsic reliability of the Alpha hardware, enables completely unattended operation of the nodes except when physical maintenance is required.

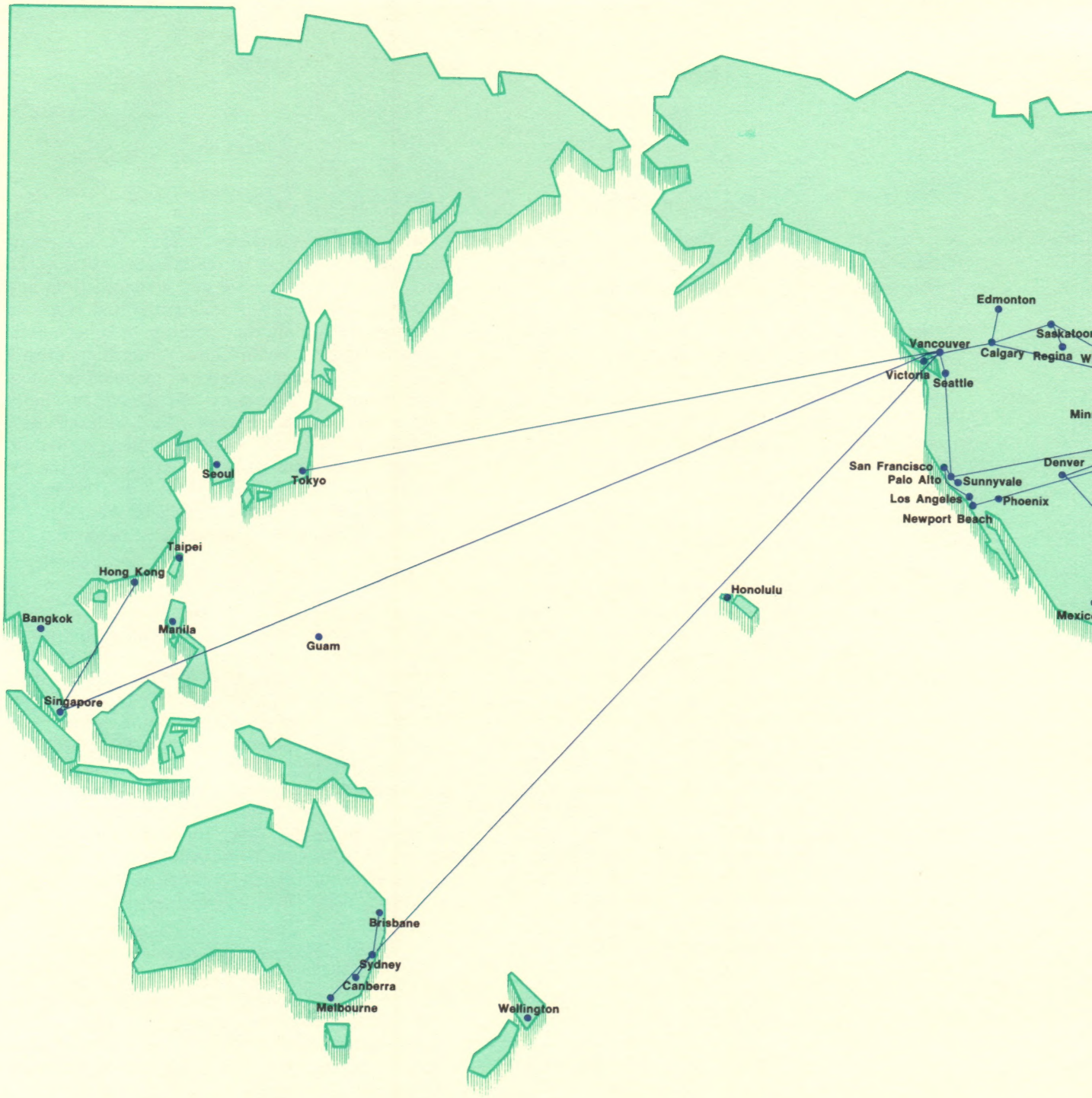
Enhancement Capability

The software in both the 3705 and Alpha nodes is developed and maintained by I. P. Sharp, thus ensuring that it is optimized for this network. This allows I. P. Sharp to have complete control over the process of continuous evolution, where new features can be added as required to meet the changing demands of network users. Changes and enhancements are always introduced in a compatible way, with the result that the whole network never has to be shut down for a new configuration or software release to be installed. The network has been in continuous operation without a single shutdown since 1976.

Network Maintenance

Each node continuously monitors its own status and the status of the lines connecting it to its neighbour nodes. At regular intervals the node reports its status through the network logging system; a report is dispatched immediately if an important event occurs such as the inability of a network link to pass data for longer than 15 seconds. These logging reports are all collected by a central SHARP APL system which maintains a complete data base of network status. This same SHARP APL system also contains the data bases of node software and configuration tables, controls the down line load operation, and provides a large number of network analysis tools for the communications personnel. This SHARP APL system is accessible from anywhere on the network and therefore allows the communications personnel equal access independent of their geographical location.

Printed in Canada
April 1984
Publication Code: 0259 8404 E1



IPSANET

- Local access through another international public data network